

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

### C. CLAIMS AS AMENDED

1. (Currently amended) An apparatus comprising:

a first tubing section and a second tubing section;

a plug fixedly engaged to a first tubing section proximate end and having a plug center spline, a plurality of ~~first~~ plug outer splines, and a plurality of first connectors;

a socket fixedly engaged to a second tubing section distal end and having a plurality of receptacles ~~socket receptacle~~, a plurality of socket receptacle splines and a plurality of second conduits;

a securing device for securing the plug to the socket;

wherein the plug may be joined to the socket ~~by the securing device~~ in a plurality of orientations so that, in each of the plurality of orientations, ~~when the plurality of splines in the plug mate with the plurality of receptacles in the socket~~, the plurality of first conduits automatically align with the plurality of second conduits in an alignment; and

wherein the plug, the plurality of splines and the plurality of first conduits are of unitary construction with each other; and

wherein the socket, the plurality of receptacles and the plurality of second conduits are of unitary construction with each other;

wherein the plug center spline forms a cylindrical passage having an inside passage diameter that is the same as an inside plug wall diameter;

wherein the socket receptacle forms a socket cylindrical passage having a socket cylindrical passage diameter that is the same as an inside diameter of an inside wall of the socket; and

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

wherein a cavity created by the socket receptacle and the plurality of socket receptacle splines is shaped so that the plug center spline and the plurality of plug outer splines will intermesh with the socket receptacle and the socket receptacle splines when the plug and socket are plugged together; and

wherein the plurality of plug outer splines and the plurality of socket receptacle splines are coaxially symmetric and have the same dimensions so that the alignment can be achieved in the plurality of orientations.

2. Canceled.
3. (Previously amended) The apparatus of claim 1, wherein the securing device is a coupling collar adapted for connecting the plug and the socket, the coupling collar initially engaged with the plug.
4. (Previously amended) The apparatus of claim 1, wherein the plug further comprises a plurality of fine threads.
5. (Previously amended) The apparatus of claim 1, wherein the socket further comprises a plurality of coarse threads.
6. (Previously amended) The apparatus of claim 5, wherein the plurality of coarse threads of the socket are tapered.
7. (Currently amended) The apparatus of claim 1, wherein the first tubing section and the second tubing section are connectable in two distinct orientations.
8. (Previously amended ) The apparatus of claim 1, wherein the first tubing section and the second tubing section are connectable in three distinct orientations.
9. (Previously amended ) The apparatus of claim 1, wherein the first tubing section and the second tubing section are connectable in four or more distinct orientations.

Attorney Docket No AHUG.011

Serial No. 10/633,471

Response to Office Action mailed 10/30/2006

10. (Previously amended) The apparatus of claim 1, wherein the plurality of first conduits and the plurality of second conduits are adapted to receive a plurality of wires, each capable of carrying an electrical current, and wherein the plug has an interior lip so that the each of the plurality of wires can pass through each of the plurality of first conduits and into a casing interior.

11. Canceled.

12. Canceled.

13. (Previously amended ) The apparatus of claim 1 wherein the first tubing section and the second tubing section are pipe.

14. (Previously amended ) The apparatus of claim 1 wherein the first tubing section and the second tubing section are casing.

15. (Previously amended ) The apparatus of claim 1 wherein the first tubing section and the second tubing section are used to produce hydrocarbons from a well bore.

16. (Previously amended ) The apparatus of claim 1 wherein the first tubing section and the second tubing section are used to produce water from a well bore.

17. (Previously amended ) The apparatus of claim 1 wherein the first tubing section and the second tubing section are connectable in a plurality of distinct orientations.

18. (Previously amended) An apparatus for providing power to a subterranean environment, comprising:

a drilling assembly containing a plurality of tubing sections;

a plurality of tubing joints for connecting the plurality of tubing sections together, each tubing joint comprising:

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

a plug having a plug center spline and a plurality of plug outer splines and a plurality of first conduits;

a socket having a socket receptacle, a plurality of socket receptacle splines receptacles and a plurality of second conduits, ~~the plurality of receptacles adapted to receive the plurality of splines;~~

a securing device for securing the plug to the socket; and

wherein the plug and the socket may be joined in N orientations where N is equal to the number of plug outer splines; and

wherein ~~a plurality of transmission means~~ the plurality of first conduits and the plurality of second conduits are automatically aligned for ~~connectivity~~ when the plurality of splines are inserted into the plurality of receptacles and are adapted for passage through the plurality of first conduits and the plurality of second conduits plug and the socket are plugged together;

wherein the plug, the plug center spline, the plurality of plug outer splines, and the plurality of first conduits are ~~of unitary construction~~ made together in one piece; and

wherein the socket, the plurality of socket receptacles, the plurality of socket splines, and the plurality of second conduits are ~~of unitary construction~~ made together in one piece;

wherein a cavity created by the socket receptacle and the plurality of socket receptacle splines is shaped so that the plug center spline and the plurality of plug outer splines will intermesh with the socket receptacle and the socket receptacle splines when the plug and socket are plugged together; and

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

wherein the plurality of plug outer splines and the plurality of socket receptacle splines are coaxially symmetric and have the same dimensions so that the alignment can be achieved in the plurality of orientations.

19. Canceled.

20. (Previously amended) The apparatus of claim 19, wherein the securing device is a coupling collar adapted for connection to the plug and the socket, the coupling collar initially engaged with the plug.

21. (Previously amended) The apparatus of claim 19, wherein the plug further comprises a plurality of fine threads.

22. (Previously amended) The apparatus of claim 19, wherein the socket further comprises a plurality of coarse threads.

23. (Previously amended) The apparatus of claim 22, wherein the coarse threads of the socket are tapered.

24. (Currently amended) The apparatus of claim 19, wherein the ~~first tubing section~~ plug and the ~~second tubing section~~ socket are connectable in two distinct orientations.

25. (Currently amended) The apparatus of claim 19, wherein the ~~first tubing section~~ plug and the ~~second tubing section~~ socket are connectable in three distinct orientations.

26. (Currently amended) The apparatus of claim 19, wherein the ~~first tubing section~~ plug and the ~~second tubing section~~ socket are connectable in four or more distinct orientations.

27. Canceled.

28. Canceled.

29. Canceled.

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

30. (Previously amended) The apparatus of claim 19 wherein the first tubing section and the second tubing section are pipe.
31. (Previously amended) The apparatus of claim 19 wherein the first tubing section and the second tubing section are casing.
32. (Previously amended) The apparatus of claim 19 wherein the first tubing section and the second tubing section are used to produce hydrocarbons from a well bore.
33. (Previously amended) The apparatus of claim 19 wherein the first tubing section and the second tubing section are used to produce water from a well bore.
34. (Previously amended) The apparatus of claim 19 wherein the first tubing section and the second tubing section are connectable in a plurality of orientations.
35. (Previously amended) A method of using a tubing joint to join two tubing sections together, comprising:

using a first tubing section having ~~a plurality of first conduits and a proximate end~~  
~~having a plug attached that has a plug center spline and a plurality of plug outer splines, and~~  
using a second tubing section having ~~a plurality of second conduits and a distal end having a~~  
socket attached that has a cavity created by a socket receptacle and a plurality of socket  
receptacle splines attached;

aligning the first tubing section coaxially with the second tubing section;

engaging the plug of the first tubing section with the socket of the second tubing section  
so that the plug center spline and the plurality of plug outer splines intermesh with the socket  
receptacle and the socket receptacle splines in the cavity;

~~whereby the plurality of first conduits align with the plurality of second conduits; and~~

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

securing the first tubing section to the second tubing section; and  
~~wherein, when a plurality of splines on the plug mate with a plurality of receptacles in the~~  
~~socket, the plurality of first conduits are aligned with the plurality of second conduits;~~  
wherein the plug, the plug center spline, the plurality of plug outer splines and the  
plurality of first conduits are of unitary construction with each other; and  
wherein the socket, the socket receptacle, the plurality of socket receptacle  
splines~~receptacles~~ and the plurality of second conduits are of unitary construction with each  
other; and  
wherein the plurality of plug outer splines and the plurality of socket receptacle splines  
are coaxially symmetric and have the same dimensions so that the plurality of first conduits  
can be aligned with the plurality of second conduits in a plurality of orientations.

36. (Currently amended ) The method of claim 35 wherein the ~~positioning~~aligning step further  
comprises: positioning the first tubing section coaxially with the second tubing section such that  
the proximate end of the first tubing section is in close proximity with the distal end of the  
second tubing section.

37. Canceled

38. (Original ) The method of claim 35 wherein the first tubing section is vertically above the  
second tubing section.

39. (Currently amended) The method of claim 35 further comprising the step of inserting  
~~wherein a plurality of first connectors in the plurality of first conduits and a plurality of second~~  
~~connectors in the plurality of second conduits are electrically coupled by inserting the plug into~~  
~~the socket.~~

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

40. Canceled.

41. (Previously amended) The method of claim 35 wherein a coupling collar is used to secure the first tubing section to the second tubing section.

42. Canceled.

43. (Previously amended) The method of claim 35 wherein the first tubing section and the second tubing section are pipe.

44. (Previously amended ) The method of claim 35 wherein the first tubing section and the second tubing section are casing.

45. (Previously amended ) The method of claim 35 wherein the first tubing section and the second tubing section are used to produce hydrocarbons from a well bore.

46. (Previously amended) The method of claim 35 wherein the first tubing section and the second tubing section are used to produce water from a well bore.

47. (Previously amended) In a drill string of the type comprising a plurality of drill pipe sections arranged in end to end relation from a location above the ground to a lower location adjacent to an orientable tool connected to a bottom end of the drill string, and wherein the adjacent ends of the drill pipe sections are connected to each other to form a plurality of spaced pipe joints extending downwardly from the ground to the tool, an improvement comprising:

a drill string in alignment from a top end to the bottom end thereof;

wherein each pipe section is provided with a lower end having a center spline and a plurality of outer splines and an upper end having a receptacle and a plurality of receptacles receptacle splines ~~which are in alignment with and correspond with the plurality of splines on the lower end of the same pipe section;~~



Attorney Docket No AHUG.011

Serial No. 10/633,471

Response to Office Action mailed 10/30/2006

wherein the plurality of outer splines and the plurality of receptacle splines are coaxially symmetric and have the same dimensions so that the lower end of one pipe section can be mated with the upper end of another pipe section when the plurality of outer splines and the plurality of receptacle splines are intermeshed;

~~wherein each pipe joint comprises an upper drill pipe section having its splines received in the corresponding receptacles in the next adjacent lower drill pipe section;~~

wherein the outer splines and the recesses~~receptacle splines~~ can fit together in more than one orientation;

wherein the adjacent ends of the sections are threaded and wherein an internally threaded collar is received over the threaded ends to hold the drill pipe sections of each pipe joint securely together;~~and~~

~~wherein a plurality of conduits are aligned for connectivity when the splines of the upper drill pipe section are received in the corresponding receptacles in the next adjacent lower drill pipe section.~~

48. Canceled.

49. Canceled

50. (Currently amended) An apparatus for connecting a plurality of casing sections together comprising:

a first casing section;

a second casing section removably connected to the first casing section; and

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

wherein the first casing section and the second casing section are connectable in a plurality of distinct orientations by engaging a plug affixed to the first casing section and a socket affixed to the second casing section;

~~wherein a first plurality of transmission means are adapted for location within the first casing section and a second plurality of transmission means are adapted for location within the second casing section; and~~

wherein in each of the plurality of distinct orientations, ~~the~~ a first plurality of transmission means conduits are aligned for connectivity with ~~the~~ a second plurality of transmission means conduits by mating a center spline and a plurality of outer splines with ~~and a~~ corresponding plurality of receptacles, receptacle splines in a cavity formed by a receptacle and the receptacle splines; and

wherein the first plurality of conduits, the plurality of outer splines, a center spline, and the plug are all one piece, and the second plurality of conduits, the receptacle splines, the receptacle, and the socket are of unitary construction all one piece.

51. Canceled.

52. (Currently amended) The apparatus of claim 50 wherein the connection between the first casing section and the second casing section comprises:

~~a plug affixed to the first casing section;~~

~~a socket affixed to the second casing section; and~~

~~a securing device for securing the plug assembly to the socket assembly;~~

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

~~wherein the plug, the plurality of splines and a plurality of first conduits are of unitary construction, and the socket, the plurality of receptacles and a plurality of second conduits are of unitary construction.~~

53. (Previously amended ) The apparatus of claim 52, wherein the securing device is a coupling collar adapted for connection to the plug and the socket, the coupling collar initially engaged with the plug.

54. (Previously amended) The apparatus of claim 53, wherein the plug further comprises a plurality of fine threads.

55. (Previously amended) The apparatus of claim 53, wherein the socket assembly further comprises a plurality of coarse threads.

56. (Previously amended) The apparatus of claim 55, wherein the coarse threads of the socket assembly are tapered.

57. (Previously amended) The apparatus of claim 52, wherein the first tubing casing section and the second tubing casing section are connectable in two distinct orientations.

58. (Previously amended) The apparatus of claim 52, wherein the first tubing casing section and the second tubing casing section are connectable in three distinct orientations.

59. (Previously amended) The apparatus of claim 52, wherein the first tubing casing section and the second tubing casing section are connectable in four or more distinct orientations.

60. Canceled.

61. Canceled.

62. Canceled.

63. (Previously amended) The apparatus of claim 52 wherein the first tubing casing section and the second tubing casing section are pipe.

Attorney Docket No AHUG.011  
Serial No. 10/633,471  
Response to Office Action mailed 10/30/2006

64. Cancelcd.

65. (Previously amended) The apparatus of claim 52 wherein the first casing ~~tubing~~ section and the second ~~tubing~~casing section are used to produce hydrocarbons from a well bore.

66. (Previously amended) The apparatus of claim 52 wherein the first ~~tubing~~ ~~secti~~ncasing section and the second ~~tubing~~casing section are used to produce water from a well bore.